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ABSTRACT

The first in a three year sequence, the study reported here investigated how knowledge of text structure affects reading comprehension and writing production. Specifically, the focus was on the development of an appropriate scaffold for teaching fifth and sixth grade students to use text structures effectively in comprehending social studies texts and to produce expository texts on social studies topics. Instruction about compare-contrast text structure was introduced to the 22 sixth grade students in the treatment group using a process writing approach. (The 23 sixth grade students in the control group were involved only in the posttesting.) The instructional program focused on teaching students to select the relevant information, add necessary background information, and impose an appropriate organizational pattern from a workbook containing social studies texts consisting of compare/contrast passages, related questions, and compare/contrast charts. The three assessment tests created for pre- and posttests were free recall, multiple-source summarization, and writing production tasks. The results indicated that the instruction enhanced students' ability to both identify and organize expository writing, improved their performance in the free recall test, and improved their selection and organizing of information in the free writing test. (Four appendixes contain a sample passage, questions, and a chart; samples of instructions for identifying compare/contrast patterns; steps for writing compare/contrast texts; and student writing samples. A reference list is also provided.) (EL)

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Research Series No. 161

THE EFFECTS OF INSTRUCTION IN COMPARE/CONTRAST TEXT STRUCTURE ON SIXTH-GRADE STUDENTS' READING COMPREHENSION AND WRITING PRODUCTS

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Abstract

This study is the first in a three-year sequence examining the introduction of instruction about text structure within classrooms using a process-oriented approach to writing. The first year's study focused on the effects of an instructional intervention introducing sixth-grade students to a strategy for gathering and organizing information based on compare and contrast text structures. The three-week intervention integrated research on text structures with instructional research on sensitizing students to sources of information for answering questions. As a result of the intervention, students showed improvement on three dependent measures: free recall of a compare/contrast passage, summarization across multiple passages, and free writing. A questionnaire administered during instruction indicated that students had internalized the questions guiding information-gathering for compare/contrast activities. Results are discussed in terms of direct tests and both near and far transfer.

THE EFFECTS OF INSTRUCTION IN COMPARE/CONTRAST TEXT STRUCTURE ON SIXTH GRADE STUDENTS' READING COMPREHENSION AND WRITING PRODUCTIONS[1]

Taffy E. Raphael and Becky M. Kirschner[2]

The connections between reading and writing have received a great deal of attention in recent literature. For example, it has been suggested that writing and reading are both composing processes (Tierney & Pearson, 1983; Smith, 1983), that readers must learn to think as writers (Pearson & Tierney, 1984), and that reading and writing may be two sides of the same basic process (Squire, 1983). While relationships between the two language processes have long been recognized (Stotsky, 1983), it is only recently that active, constructive natures of both processes have been stressed when referring to both. Research within a schema-theoretic view of reading (Anderson & Pearson, 1984; Bransford, 1979; Mason, 1984) underscores the constructive nature of text comprehension, while studies within the process approach to writing stress the composing processes that underlie writing (Bereiter, 1980; Calkins, 1983; Flower & Hayes, 1981; Graves, 1983; Murray, 1982). Given the complexity of each individual process and the relationships between them, research has rightfully begun to focus on connections not only between the processes themselves, but on how instruction in both areas is related.

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[1]This paper was presented at the April 1985 annual meeting of the American Educational Research Association in Chicago. We appreciate the contributions to this project of several key people: Larry Vance, Jerry Balderama, and their sixth grade students of Grand River Elementary School, Lansing, Michigan, for their cooperation throughout the study; Suann Gazdecki and Julie Henrich for assistance in scoring data; and Lin Chang and Adolfo Navarro for data analyses. This research was sponsored in part by an Elva Knight Research Award from the International Reading Association and the Institute for Research on Teaching (IRT), Michigan State University.

[2]Taffy Raphael is coordinator of the IRT's Expository Reading and Writing Project and an associate professor of teacher education. Becky Kirschner is a research assistant with the project.

Text Structures, Comprehension, and Production

Research about how knowledge of text structures affects reading comprehension and writing production promises to add to our knowledge of the relationship between instruction in reading and writing. The examination of the role of text structure in discourse dates back to the time of Artistotle's rhetoric (Aristotle, translated by Cooper in 1960). Aristotle identified three important facets of discourse--invention, arrangement, and style. According to this concept, text structure knowledge plays a particularly important role during both the invention and arrangement of topics. This knowledge helps direct the writer to the information needed and helps in the organization of the accessed information. Aristotle introduced the notion of using questions to guide one's thoughts during invention. Both knowledge of text structure and the importance of questions underlie much of today's research on narrative and expository text. For example, Kintsch and van Dijk (1978), Stein and Glenn (1979), Mandler and Johnson (1977), and Rumelhart (1975) have developed story grammars to analyze narrative structures, while Meyer (1975) has similarly analyzed expository structures. Armbruser and Anderson (1981) have examined expository texts in terms of the questions different types of texts answer, while Raphael (Raphael & Pearson, 1985; Raphael & Wonnacott, 1985) has studied teaching students strategies for answering questions that refer to specific expository texts read.

The research study presented in this article is the first study in a three-year sequence examining the introduction of text structure instruction within a classroom using a process-writing approach. The four areas of influence on comprehension and composition considered are subject (i.e., topic selection), purpose, audience (i.e., reader/writer relationships), and form (i.e., text structures). In the first study, we explore the effects of an

instructional intervention emphasizing form on students' ability to understand and write expository texts. We wish to stress that the research described below is but an initial step in enhancing students' composition and comprehension. Writing and reading form a communicative process between author and reader (Schallert, 1985), thus all instruction should be embedded within the context of communication. Writers write for a purpose, to reach a specific audience; and select their topics and form with specific goals in mind. One important part to teaching students these relationships is identifying appropriate ways of introducing complex and somewhat abstract concepts so they can become tools for students' use in comprehending and composing. This study describes the effects of introducing students to a strategy for organizing information in one type of expository text form.

Narrative text comprehension and production. Research in story comprehension documents positive relationships between students' knowledge of the structures of narratives and their ability to understand narratives (e.g. Applebee, 1978; Baker & Stein, 1981). Further, research suggests that this knowledge facilitates students' ability to recall information from stories (e.g., Brennan, Bridge, & Winograd, in press; Stein & Glenn, 1979). Research on the production of narratives suggests that the internalization of story structures enhances the quality of students' written productions (Applebee, 1978; Baker & Stein, 1981). Graves' (1983) work with first-grade students has shown that even very young children have internalized story grammars and use them to produce narrative texts. Further instructional research (e.g., Fitzgerald & Spiegel, 1983; Gordon & Braun, 1983) indicates that students can be taught story structures to improve their ability to produce stories.

Expository comprehension and production. Research in text structure knowledge and the comprehension of expository texts has focused on the relationship between students' awareness of the structures and their ability to recall texts. First, as with research in narratives, studies demonstrated a positive relationship between knowledge of text structures and recall ability (Meyer, 1975; Taylor, 1980), but this awareness is subject to developmental differences (Englert & Heibert, 1984; McGee, 1982). Some instructional research has demonstrated that making students sensitive to top-level text structures improved their comprehension of text (Barlett, 1978; McGee & Richgels, 1985; Meyer, Brandt, & Bluth, 1980; Taylor, 1982). But little research exists about expository text production.

Historically, rhetoricians have assumed that instruction in form is fundamental to skilled writing, but research in this area is limited. The research that does exist indicates that knowledge of text structure is associated with an ability to structure one's own texts (Dunn & Bridwell, 1980) and to produce summaries based on texts read (Taylor & Beach, 1984). Yet little instructional research with younger students exists. Taylor (1982) has demonstrated that seventh-grade students can be taught to summarize social studies texts using a procedure based on text structure sensitivity, but this has not been examined in terms of transfer of this knowledge to other writing activities.

In summary, much research exists to suggest a strong, positive relationship between knowledge of structures and both reading and writing of narratives. Similarly, these relationships are demonstrated for comprehension of expository texts. However, links between comprehension and production of expository texts, while inferable, have not been adequately studied, particularly with regard to the role of text-structure knowledge in children's

production of expository text. More research, especially instructional research, is needed in this area. Instructional research is particularly useful for two reasons: first, to enable the drawing of causal relationships between such knowledge and production abilities, and second, to delineate appropriate instructional approaches for teaching expository reading and writing.

Instruction in Expository Text Structures

In designing a systematic program of instructional research in expository reading and writing, it is important to identify the role that text structure plays in reading and writing, to determine the intersections of reading and writing, and to develop a scaffold that will guide students' reading and writing of expository texts. First, it is necessary to examine the *processes* of reading and writing to determine the role that knowledge of structure plays in both processes. In the reading process, readers use structure to aid comprehension in a variety of ways: (1) to deduce the gist of the text, (2) to identify most important, or top-level ideas, (3) to identify subordinate details, and (4) to fill in missing information with relevant background knowledge (i.e., to draw appropriate inferences) (Kintsch & van Dijk, 1978; Meyer, 1975). Several researchers (e.g., Applebee, 1981; Graves, 1983; Murray, 1982) have described the writing process in terms of its subprocesses, including prewriting activities, drafting, revising, and editing, all guided by an awareness of subject, audience, and purpose. In the writing process, the writer uses structure to aid production in a variety of ways: (1) to explore the subject, (2) to clarify the purpose, (3) to make decisions about arranging ideas, and (4) to revise the ways ideas are presented. In summary,

structure plays a role throughout the reading process. In the writing process, structure is particularly important during invention and revision.

Second, it is important to identify the intersection of the reading and writing processes so that instruction can be directed at both processes. To date, researchers have identified this intersection as occurring in those tasks that require a writer to read information from a single source and produce a well-formed summary. While reading and summarization do require that students have an awareness of the structure of what they have read and that they use this knowledge during production, summarization strategies do not provide students with the strategies needed to create their own expository texts. An intersection closer to text generation involves a task that requires a writer to integrate information from multiple sources to produce an original text. This intersection of reading and writing processes occurs because while the structures must be imposed by the writer, the content has been supplied by texts. Thus, strategies used to perform this task could be transferable to the students' free recall and free writing activities.

Third, a well-planned scaffold (Applebee & Langer, 1984) to promote expository reading comprehension and expository writing abilities must be developed. Such a scaffold should guide students' reading and writing and provide them with a means for developing student independence in using these abilities. The term scaffold refers to the concept of a support structure, one that is temporary and can be applied in a flexible manner as more or less support is needed (Gavelek, in press). Applebee and Langer have stressed the importance of scaffolding in developing language and the need for students to internalize the scaffold provided by their teacher so that they are no longer dependent on others for effective use of strategies. What is needed, in this case, is a scaffold that will help students get information from text they

read and help them organize the information into an appropriate form for writing about it. Thus, the scaffold should (1) make students aware of the structure of the texts they read to increase their access to relevant information, (2) help students supplement this information by adding relevant background knowledge, (3) give students a way to organize information, and (4) make students aware of a structure that they could use to write about the information.

Focus of Present Study

The focus of the present study was on the development of an appropriate scaffold for teaching fifth- and sixth-grade students to effectively use knowledge of text structures in comprehending social studies texts and to produce expository texts on social studies topics. It is the first study in a three-year project designed to (1) test the effects of an expository writing scaffold based on text-structure knowledge, (2) implement the scaffold in a process-oriented writing program, and (3) examine maintenance by both teachers and students in the year following intervention. We based our study on the following assumptions:

(1) To write expository texts in a content area (e.g., social studies), students must know how to read those texts like the authors of those texts do. That is, readers must be aware of conventions of content texts used by authors to communicate: this awareness is best developed by being writers themselves.

(2) Each content area uses forms specific to that area to organize information. Armbruster and Anderson (1981) have found that social studies texts are organized by definitions, temporal sequences, explanations, compare/contrasts, and problem/solutions. While these structures are rarely found in "pure" form, questions specific to each type of form can aid in identifying important information provided by the author, as well as that information that must be obtained from a source outside the immediate text.

(3) The primary purpose of expository writing is to provide information. To meet that purpose, authors use forms that organize

information in useful ways for their readers. Specifically, in social studies texts, authors write to define, trace development, explain what happened, compare and contrast people, places, or things, and explain the development of a problem and its solution(s).

(4) Authors of social studies texts can be thought of as writing texts to answer questions that correspond to their purpose for writing (Armbruster & Anderson, 1981). For example, if the author's purpose is to compare and contrast two countries, two explorers, and so forth, he or she would create a text to answer certain basic compare/contrast questions.

The specific structure focused on in this study was the compare/contrast form. This was selected for two reasons. First, research by Englert & Heibert (1984) demonstrates that compare/contrast text forms are among the most difficult for third- and sixth-grade students to recognize, that students are developmentally able to recognize some discourse types earlier than others. Thus, we chose to focus on compare/contrast structures in expository writing to provide a reasonable test for the success of the scaffolding provided. Second, analysis of the social studies texts used by the students in this study indicated that this structure would be encountered in their texts, in pure form in some instances, as part of larger structures, and in their activity pages (e.g., compare life in the desert with that in Cairo).

The Research Question

The present study was concerned with the following question:

1. Will providing a scaffold specific to the use of text structures in expository writing enhance students' ability to produce written text:

   a. when content and structure is available from a single source?

   b. when content is available from multiple information sources, but the structure must be provided by the reader/writer?

   c. when both content and structure must be provided by the reader/writer?

Method

Subjects

Forty-five students, varying in both ethnic background and ability levels, from two sixth-grade classrooms participated in the study. Students were assigned to the treatment (N = 22) or control (N = 23) group based on classroom membership. The treatment class was identified as the result of one teacher volunteering to let his students participate in the program. The control class was then identified as having students of similar achievement and ethnic backgrounds. The control group participated often in writing activities as part of its ongoing curriculum, thus was considered to provide an adequate test of the treatment. Subjects were assigned within treatment groups to ability levels (high, average, low) based on a combination of teacher judgment and two standardized test scores: the language and the reading comprehension scores from the Stanford Achievement Test. These test scores indicated the two treatment groups did not differ significantly on either the reading comprehension or the language subtest ($p > .10$), a lack of difference both overall, and when comparing ability levels. Differences in ability levels within each group were reliable on both subtests.

Materials

Two types of materials were developed for the study--those used during instruction and those used during assessment. Instructional materials will be described first, then assessment activities.

Instructional materials. Armbruster & Anderson (1981) provided the basis for instructional material development in their article describing different text structures and the questions each type of text can answer. The materials

were designed to (1) make students aware of the top-level structure used by authors in writing compare/contrast texts, (2) make students aware of the questions authors of compare/contrast texts write to answer, (3) provide students with a framework for organizing information that authors of the texts provide, and (4) teach students an organizational pattern they can use to summarize information derived from text.

A workbook consisting of compare/contrast passages, related questions, and compare/contrast charts was created as an instructional scaffold to be used during the four-week instructional program. The workbook contained social studies texts, compare/contrast question activities for each text, a visual aid (i.e., chart) to identify the information from the question activities, pattern guides for demonstrating the organization of text, and a lined area for writing a summary of each text. The texts ranged in length from 150 to approximately 250 words, in readability level from early third through sixth grade, and included exemplary compare/contrast texts as well as non-examples. The question activities took two forms. In the initial lessons, four questions answered in compare/contrast texts followed each text: (1) What is being compared or contrasted? (2) On what are they being compared or contrasted? (3) How are they alike? (4) How are they different? In later lessons, students were to generate both the questions and the answers. To help them determine the important information to include in their texts, a visual aid, or chart for identifying answer information was used (see Appendix A). To help make the transition from information identification to the organization and presentation of the information, pattern guides for three possible organizational structures were used (see Appendix B). To guide their writing of the text, and to encourage self-monitoring, a handout called "Steps for Writing Compare/Contrast Texts" was distributed (see Appendix C).

Assessment materials. Three assessment tests were created for pre- and posttest measures: free recall, multiple-source summarization, and writing production tasks. These tests varied on the presence or absence of the content and the appropriate form or structures (see Table 1).

Table 1

Dependent Measures: Form and Content Use

TASK	READER	WRITER
Free recall summary	Form and content supplied by text	Uses form and content supplied by text
Multiple source summary	Content supplied by text	Uses content from text, writer provides form
Free writing	Neither content nor form provided	Writer supplies content and form

There were two forms for the *free recall* measure, both approximately 250 words in length and written on a middle-elementary grade level (Fry, 1968), both containing relatively unfamiliar information (Japan and France; Shoshone and Sioux Indians). Passages were followed by an interpolated task (i.e., three math computation problems), and a lined paper headed with directions to write down everything that they could remember, using words from the text or their own words. Directions indicated that students should read the text thoroughly, then when ready, turn to the next page and complete the three math problems. They were then directed to write what they could remember from the passage, using their own words or words from the article. They were not allowed access to the text during the recall.

Two forms for the *multiple-source summarization task* each consisted of two passages on somewhat related topics (The Appalachian Culture, Mexican-American Culture; Sparta, Athens). The first page of this test presented a general compare/contrast question (e.g., How were Sparta and Athens alike and different?) and several blank lines for writing. This page was followed by two more pages, one article per page. Directions (also repeated orally) at the top of the first page stated: "Read both of the following texts. Then use the information from both texts to write a good answer to the question." It was stressed that they could look back in the text as frequently as they wanted. A note paper was provided for the students to use in planning their summaries, though they were not prompted nor directed to do so. They were only told that they should not write on the articles, to use the blank paper if they wanted to write anything other than their summary.

The *writing production task* consisted of directions to write a letter to a friend, telling how two people, places, or things are alike or different. This assignment followed a general brainstorming session to generate possible topics (e.g., Think about what Monday morning is like at your house. What about Saturday morning? Are they alike? Different? How?).

Finally, a brief questionnaire to be used during the first and the second week of training was developed to assess students' internalization of questions answered by compare/contrast texts and their ability to identify compare/contrasts texts. It requested that they (1) identify the type of text they were learning about, (2) list the four questions this kind of text answers, and (3) recall as much as they could from any of the passages they had read during the previous days of instruction.

Procedure. Students from the control group participated only at the time of posttesting.[3] Students from the training group first were pretested on the three dependent measures. The recall test and the summarization task forms were counterbalanced across pre- and posttesting. Following pretests, the seven-day instructional program was implemented in the training group's classroom (instructed by the authors) over the course of three weeks. The scaffolding procedures were based on those used by Raphael in her instruction of two different comprehension strategies--teaching children sources of information for answering questions (Raphael & Pearson, 1985; Raphael & Wonnacott, 1985), and teaching students a concept of definition (Schwartz & Raphael, in press a & b). Each session lasted approximately 45 minutes. On the first day, students were introduced to what they would be studying, and to why it would be important to learn about it, using guidelines for comprehension instruction suggested by Roehler, Duffy, & Meloth (in press). Thus, text structure as a concept was presented, as were characteristics of compare/contrast texts specifically (e.g., top-level structures). The instruction began with introducing a highly familiar situation that invited comparison and contrast: Students were asked to pretend that their parents had said they could buy one puppy, but when they went to the pet shop, they found two

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[3]The teacher from the treatment group volunteered for participation in the spring of the school year. It was necessary to begin treatment immediately to insure that there would be sufficient time for the instruction and testing. However, the control group did not agree to participate until a few weeks later. It was decided that administering a pre- and posttest to this group within the same 2 week period would likely contaminate the test results, either through practice effects or through motivational problems from asking students to perform these tasks so close to each other, with no intervening activity. Since students' writing was unlikely to undergo developmental change, we elected not to administer both tests. Further, the standardized tests indicated comparability of groups, and students were randomly assigned to classrooms at the beginning of the school year.

puppies there. They then were directed to think about the questions to ask that could help them decide between the two puppies. This example was then used to introduce the four questions that compare/contrast texts can answer, and key words and phrases that signal this type of text. The information was then applied to a brief compare/contrast text.

The second day began with the administration of the brief questionnaire designed to assess the degree to which they had internalized the material presented on the first day. This was followed by a review of the top-level text structures and questions and the introduction of the visual aid/chart. Students then applied information and question answers from the passage used on the first day of instruction to the chart; then they repeated the procedure with a new passage. Discussions were held focusing on how reading to answer questions and organizing information can help students to remember material more easily and for a longer time.

On the third day of intruction the questionnaire from Day 2 was repeated. Students then read five, 150-200 word passages, three of which were compare/contrast in structure. Students identified the three compare/contrast texts and discussed the clues that informed their decision about structure used. Brief attention was given to whether the form was part/part (the two items compared are discussed trait by trait), whole/whole (first one item is discussed in detail, then the other), or mixed (a combination of the two).

On the fourth day of instruction, students were introduced to summary writing using the questions and charts as guides. This was practiced using a variety of texts for Days 5 through 7. Issues such as how to write topic sentences, how to monitor use of parallel information, and how to include both comparative and contrastive information were included, using the support

materials shown in Appendices 2 and 3 and in the texts, questions, and charts.

Following instruction, the three assessment tests were administered over three consecutive days in both the training and the control classrooms.

Dependent Measures

The outcome of the instructional program was measured in terms of changes in form, complexity, and type of information included in students' recalls and summaries. In addition, evidence that students used structure to guide the generation of text was measured. To examine the influence of the instruction on the children's use of appropriate forms in texts generated, a Primary Trait Scoring (PTS) system specific to producing compare/contrast texts was adapted from Mullis' (1980) method of primary trait scoring. The primary trait measured was students' use of a top-level compare/contrast structure (e.g., identification of similarities and differences in two or more things). Secondary traits included identifying the attributes on which things were compared or contrasted, use of key words and phrases, and use of one or two specific organizational patterns (e.g., part by part). A weighted score from 0 through 3 was given based on the degree of presence of each attribute. For example, in use of key words or phrases, 0 indicated absence; 1 indicated presence but without contributing to the structure; 2 indicated use to enhance structure but at a naive level; 3 indicated successful use of key words and phrases. This scoring scheme was used to assess the use of form on all three assessment instruments.

Thus, the following dependent measures were available for analyses: (1) PTS, generated text, (2) PTS, free recall, and (3) PTS, summarization.

Results

Results are based primarily on the three dependent measures described above. Separate analyses of variance (ANOVAs) were conducted for pre- and posttest comparisons within the treatment group and for treatment control group comparisons. While all trained students had pre- and posttest scores, the control-group students had only posttest scores available. The first set of ANOVAs used a 3 x 2 mixed analysis involving only the treatment students and the between-subjects factor of ability (high, average, low), and the repeated measure of time (pretest, posttest). Means and standard deviations for the three dependent measures (writing production, free recall, and multiple source summary) are included under Treatment columns in Table 2. The second set of 3 x 2 ANOVAs involved both treatment and control groups and between-subjects factors of ability (high, average, low) and treatment group (training, control). All significant effects for ability were tested using Scheffe post hoc procedures. Means and standard deviations for these analyses are found in by comparing Treatment and Control posttest columns in Table 2.

A third analysis involved the scores students received on the questionnaire to determine whether they had internalized the text identification scheme with the related questions. These are available only for the treatment group (see Table 3).

Writing Production Task

The analysis of variance for the writing production task revealed significant main effecs for both ability level, $F(2,37) = 7.09$, $p < .01$, and time, $F(1,37) = 118.71$, $p < .01$, with no significant interactions. The significant effect for ability is attributed solely to the difference between high and low

Table 2

Pre/Posttest Comparison of Means Within Treatment Group and Posttest Comparison of Means Between Treatment and Control Groups

Ability	Writing Production				Free Recall				Multiple Source			
	Treatment			Control	Treatment			Control	Treatment			Control
	Pretest	Posttest		Posttest	Pretest	Posttest		Posttest	Pretest	Posttest		Posttest
High	5.86(1.57)	9.43(1.90)	--	8.00(1.41)	2.29(1.70)	5.83(0.40)	--	2.50(2.07)	2.43(0.53)	4.71(1.25)	--	3.33(0.52)
Average	4.38(2.67)	6.00(3.38)	--	6.78(1.30)	2.57(1.72)	4.42(1.62)	--	2.33(1.22)	1.75(2.05)	3.13(1.96)	--	1.56(0.88)
Low	2.00(1.00)	7.17(2.64)	--	4.13(3.98)	.67(1.21)	2.67(2.34)	--	1.25(1.04)	1.33(0.52)	2.50(1.76)	--	2.38(1.77)

Note. Standard deviations appear in parentheses.

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Table 3

Means for Internalization Ouestionnaire Responses

	Day 2	Day 3
High	1.70[a]	4.50
Average	1.80	4.10
Low	.28	1.80

[a]Maximum = 5

ability students ($p < .05$), though means indicate a trend for gradually decreasing scores across the three levels of ability. The students at all ability levels made significant gains between pre- and posttests.

The analysis of variance for the treatment/control group comparisons revealed a significant main effect for ability, $F(2,37) = 5.40$, in predicted directions. The treatment effect was not significant. There were no significant interactions, though trends in the predicted direction existed for low achieving students.

Free Recall

The second set of analyses allowed consideration of the effect of instruction on their oganization of recalled information. Two ANOVAs were performed on the PTS dependent measure for the free recall assessment. Significant differences were revealed for ability, $F(2,33) = 6.82$, $p < .01$, and time, $F(1,33) = 59$, $p < .01$, with no significant interactions. Consistent with the previous measure, ability differences were in predicted directions. Students across ability levels improved in performance following training.

The analysis of variance for the treatment/control group comparison revealed significant differences for treatment, $F(1,36) = 21.84$, $p < .01$, and ability, $F(2,36) = 7.53$, $p < .01$. While difference trends were in predicted directions, post hoc analyses revealed significant differences ($p < .05$) only between high and low ability students.

Summarization Across Multiple Sources of Information

To examine the effect of instruction on students' ability to organize information presented in summaries, analysis of variance using the PTS for the multiple-source summarization task was performed. Again, significant effects were revealed for both ability, $F(2,36) = 4.07$, $p < .05$, and time, $F(1,36) = 11.74$, $p < .01$, with no significant interactions. Results were consistent with those described for previous measures with performance differences in predicted directions for both ability and testing time.

The analysis of variance for the treatment/control group comparison revealed significant differences again for treatment, $F(1,38) = 5.72$, $p < .05$, and ability $F(2,38) = 6.39$, $p < .01$. There were no significant interactions, and difference trends were in predicted directions. Post hoc analysis indicated that the significant effect for ability is attributable to significant differences between high ability and both average and low ability students.

Internalization of Structure Questionnaire

The questionnaire was administered during the first and the second weeks of instruction. A total score of 5 was possible for naming the type of text studied and the four questions the text answers. Means are presented in Table 3. Examination of the means reveals a dramatic increase for students of all ability levels. Given the amount of increase, formal analyses were not conducted. The measure does indicate that by the second week of instruction

students had become aware of both the type of structure they were studying and the four questions this type of text answers.

Discussion

This study focused on assessing the effects of providing a scaffold designed to enhance students' sensitivity to text structure. The scaffold considered the dual nature of the strategies involved: identification of the relevant information in expository texts and selection of an appropriate organizational pattern for presenting the relevant information. The discussion is organized around the research question initially posed: Will providing a scaffold specific to the use of text structures in expository writing enhance students' ability to read and produce expository text? The three conditions under which students' abilities were tested varied with the availability of content and form.

The multiple-source summarization task was considered to be the most direct test of the students' internalization of the scaffold since most information was provided in the text, but the students had to select the relevant information, add necessary background knowledge, and impose an appropriate organizational pattern. The instructional program focused specifically on teaching the students to succeed in these three activities. Whether comparing experimental gains from pretest to posttest or between trained students and control group, the scaffolding enhanced students' ability to both identify and to organize relevant information. This study, therefore, lends empirical support to those who have stressed that scaffolding is important to students' improvement of their expository writing (e.g., Applebee & Langer, 1984). Further evidence of scaffold use was available from informal observations during testing and from the examination of the planning notes spontaneously

made by students of the treatment group during testing. During the posttest, about 22% of the students in the treatment group spontaneously organized the information from the text into chart form to answer the four compare/contrast questions, indicating an ability to *identify* this information. Some of these same students did not convert this information into a summarization of the two texts, suggesting that the instruction may have been differentially effective with students, related to different components of the scaffold. Reasons for lack of movement from the selection/organization task prompted by the chart to the actual production of a summary appeared to vary. One possible explanation is a lack of motivation to complete the test. Another reason, for some students, appeared to be lack of time to develop a complete summary. A third possibility for these differences may be development. Some researchers like Falk (1979) have argued that comprehension precedes production. It may be that students could comprehend the text and select important information after the instruction, but that this was not translated into increased skill in producing text. Examination of the relative role of each component on expository text comprehension and production is a logical extension of this study.

The free-recall condition was considered a test of near transfer to reading comprehension. During instruction, students had used the questions, charts, and guides to access information presented in available texts. In the free-recall task, students were required to use the scaffold not only as an aid to production, but as an aid to memory as well: using the content and the form provided in the text. Consistent with current research (e.g., McGee, 1982; Meyer et al., 1980; Taylor, 1980; Taylor & Beach, 1984), students in this study whose sensitivity to text structure was increased demonstrated improved performance on the selection and organization of information when they

no longer had access to the text. This increase in performance scores cannot be attributed merely to an increase in the total number of ideas recalled. A preliminary analysis examining change in quantity rather than quality of ideas recalled indicated no significant differences. However, the results of the analysis of the PTS did indicate an increase in the recall of top-level ideas consistent with the questions compare/contrast texts answer. Thus, the training appears to have had its greatest impact on the type of information and organization of that information selected.

Further, the importance of internalizing the questions on improving free recall of expository text was demonstrated by the results of the mid-instruction assessment. In the first week, students were generally unable to recall the questions or even the type of text with any degree of success. By the second week, students demonstrated that they had internalized the type of text and the questions, measured in terms of their written responses to a brief questionnaire. They also were able to recall important information from texts presented up to three days previously.

The third condition, free writing, presented a test of far transfer in that students had to provide both structure and content. The improved performance of students in the training group from pretest to posttest demonstrated the effectiveness of this scaffold as an aid to selecting and organizing information from the students' background of experiences. Appendix D provides examples of students' first drafts during pre- and posttesting, their spontaneous generation of the chart to aid them during the posttesting, and improved sensitivity to the questions compare/contrast texts answer. Note that Dennis,[4] the lower ability student, improved in his concept of the

[4]Teachers' and students' names in this paper are pseudonyms.

purpose of compare/contrast texts. In the pretest first draft, he actually presents a narrative of delivering papers, including many details somewhat irrelevant to this theme, and particularly irrelevant to comparison or contrast. He has a much clearer sense of comparison in the posttest, though the piece is still clearly a first draft. He states differences as well as similarities in delivering papers on the weekend versus on Monday. Both Josh and Charlene created charts using blank paper distributed with the test directions. Josh's sense of comparison/contrast is conveyed more explicitly than on his pretest, in identifying the traits on which he was comparing or contrasting, then in stating the similarity or difference. Charlene demonstrated increased use of explicit structural signals, stating in her posttest's first sentence, "This article compares and contrasts winter and summer. . . ." She identifies traits for comparison and contrast, then provides supporting detail.

On the writing production task, the differences from pre- to posttesting for the trained students were not replicated in the training/control group comparison. One likely explanation can be found by examining the means for both the treatment and control groups the first time they performed the task. For the treatment group this was during the pretest; for the control, this was on the posttest. While one might argue developmental differences could account for the differences, it is highly unlikely that students' free writing would change significantly during a three weeks in which no intervention is occurring. The overall group mean for the treatment group was 4.08; for the control group it was 6.30. Thus, on the writing-production task, the control group had a sufficiently higher advantage which may mask gains attributed to the instruction. On the transfer activities, the advantage was negligible

(free recall training pretest $\underline{M}$ = 1.84, control posttest $\underline{M}$ = 2.02; multiple source training pretest $\underline{M}$ = 1.83; control posttest $\underline{M}$ = 2.42). This lack of difference between the treatment and control groups suggests that other scaffolds may also provide equal support for free writing activities. The control group students had participated throughout the academic year in writing activities. In an interview, their teacher described the emphasis he had continually placed on writing and the number of opportunities students had for writing. There is a great deal of current research (e.g., DeFord, in press; Florio & Clark, 1982; Hansen, 1983) to suggest that the environment itself can enhance the quality of students' writing. That this advantage did not extend to the other two tests suggests that for expository writing in which students are asked to use information from social studies texts, rather than solely from their previous experiences, a scaffold that focuses on structure and questions is an important tool.

It is important to keep the results of the success of this scaffold in a proper perspective. While there is strong evidence to support its use to enhance students' writing of expository (specifically, compare/contrast) texts, it would be misleading to suggest that this scaffold and three week program are sufficient to encourage students' production of high quality, interesting, and meaningful texts; nor does it particularly encourage students to think of themselves as writers. It is clear from the samples of the first drafts produced by students after instruction, shown in the Appendix D that while the papers are better structured and contain more relevant and a greater amount of information overall, they lack the author's "voice." The scaffold tested in this study, in the absence of other support systems, and a goal, such as writing for a real audience, are not sufficient.

The importance of this study is that it shows what instructional materials to provide for specific points in the writing process where students appear to need support. Research on the composing process has shown that structural knowledge plays a particularly important role during planning and revision (Flower & Hayes, 1982; Murray, 1982). Bruce & Rubin (1985) in reporting how students use QUILL, a software program that provides a context for writing instruction as well as the tools needed to enhance writing, noted that students showed the least inclination to use the planning and revision aspects of the program. Their finding suggests that students must be taught how to use knowledge about structure to guide them through these two difficult phases of the writing process.

In the second year of the Expository Reading and Writing Project of the IRT, Raphael, Kirschner, & Englert (1985) examine the effects of implementing this scaffold in a long-term instructional study within different classroom contexts. That is, it seeks to implement the scaffold under a variety of conditions designed to provide students with a greater awareness of the writing process, a sense of purpose and audience, and the functions of different text types. The study examines the relative effects of the scaffold, peer-editing, and establishing a context for writing on students' prewriting, drafting, revision, and editing of expository texts. Students' topics varied from using primarily information from background knowledge to information primarily from social studies texts and related trade books. Such a study could not be conducted without evidence that the instructional scaffold has a positive impact on expository reading and writing abilities. The study reported in this paper provides the evidence needed, while extending our understanding of the impact of text-structure knowledge and question-answering strategies on students' comprehension and production of expository text.

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Appendix A

Sample Passage, Questions, and Chart

Two Kinds of Slaves

Two kinds of slaves worked on Southern plantations, house slaves and field slaves. House slaves worked closely with the planter and the planter's family. They were separated from the other slaves. They lived in or near the master's house. They were raised to believe that it was a great honor to work as servants in the main house. On the other hand, most field hands had little to do with the slave owner. Many of them lived and died without once having set foot inside the slave owner's house.

1. What is being compared? _____

_____

2. What are they being compared on? _____

_____

3. How are these two things alike? _____

_____

4. How are these two things different? _____

_____

COMPARE/ CONTRAST	BETWEEN _____ & _____		ALIKE OR DIFFERENT
COMPARED ON:			

Appendix B

Identifying Compare/Contrast Patterns

Step 1. Identify key words and phrases that tell whether the things are being compared or contrasted.

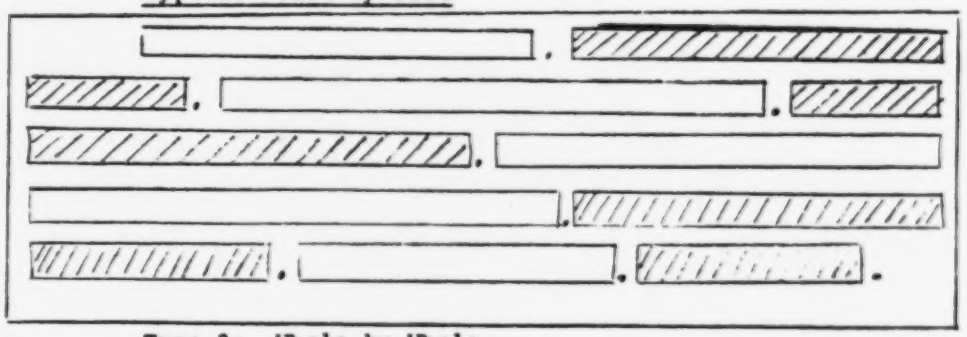
Question 1. What words and phrases tell two things are alike (+)?

Question 2. What words and phrases tell two things are different (-)?

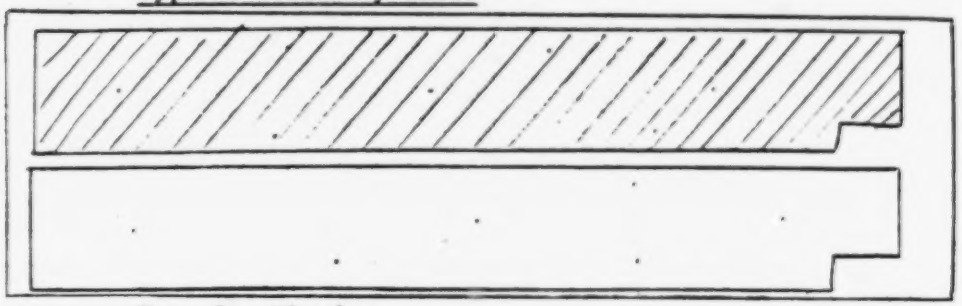
Question 3. Are the things being compared? Contrasted? Compared and contrasted?

Step 2. Identify the comparison/contrast pattern used to present the ideas.

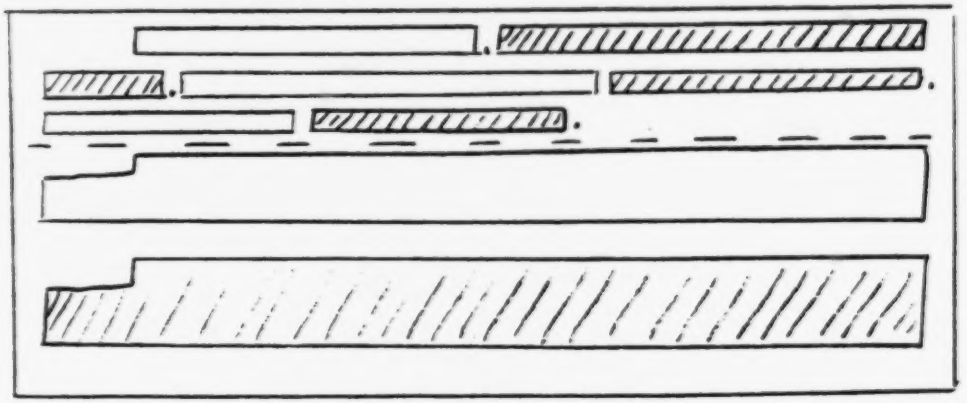
Type 1: Part by Part



Type 2: Whole by Whole



Type 3: Mixed



Appendix C

Steps for Writing Compare/Contrast Texts

Step 1. Read the text carefully.

Step 2. Ask yourself the four questions about compare and contrast texts.

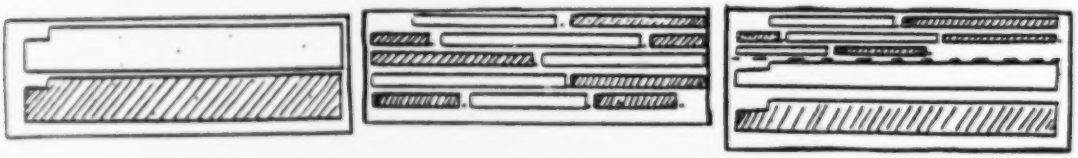
Step 3. Make up a compare/contrast chart with the answer information (you may be able to do this in your head).

Step 4. See if there is any missing information. If there is, then search your own experiences for the information, look in another text, ask someone else for help.

Step 5. When the chart is complete, then decide on the form you want to use to write your compare/contrast text. You may use whole-whole, part-part, or the mixed form. All would begin with the kind of first sentence described below. After that you would use one of the three forms.

Sentence 1. This should be a complete sentence that answers the question, "What is being compared or contrasted?"

Whole/Whole Part/Part Mixed



Checking Your Report

1. Check to see that you have answered all the questions that can be answered from the text.
2. Check to see that each sentence answers the question it is supposed to answer.
3. Compare your summary or report with the text to be sure everything is accurate (correct) and complete (contains all the necessary information).
4. Check your summary to be sure you have used correct grammar and spelling.

Appendix D

Pre- and Posttest Free Writing Activities

The three students' pre- and posttest papers below are representative of the types of changes noted in the content and the form used during the free writing activity. Dennis is a student of lower ability, Josh is of average ability, and Charlene is of higher ability level, based upon language and reading scores from the Stanford Achievement test (names are ficticious). The stories have been corrected for spelling mistakes only.

The following directions were presented to all students, both orally and in writing:

> Your writing assignment for today is to practice writing a report where you will tell how two things that you know about are alike and how they are different. The following is a list of possible topics to write about. You may pick from one of these topics, or you may choose a topic of your own. If you choose a topic of your own, check first to make sure it is one that will be OK to use.
>
> Possible topic: Winter and Summer
> Brothers/Sisters and Friends
> Living in Michigan and Living in _____
> Saturday morning and Monday morning

Dennis

Pretest

Delivering the State Journal Paper

On Monday the papers aren't that heavy but Tuesday they start getting heavier as the days go by they get heavier but Suday papers are too heavy. I have to go back two times but I soon get them all on my route. I have 38 customers all of my customers are real nice and they all pay me. But about four customers pay in the mail. I have no US Todays. I have all State Journal papers. I would tell you how much I get but no one tell me how much they get.

Posttest

Saturday Morning and Monday

Saturday is different from Monday becuase Saturday I have to get up at 7:00 am and do my papers, and they have to be done at 8:00. On my paper route I have 34 on Saturday and Sunday I have 32. I have the same amount on Monday. I have 34. The Monday paper have to be done by 4:30. It is fun, but the Sunday's are too heavy for me, but I can handle them.

Josh

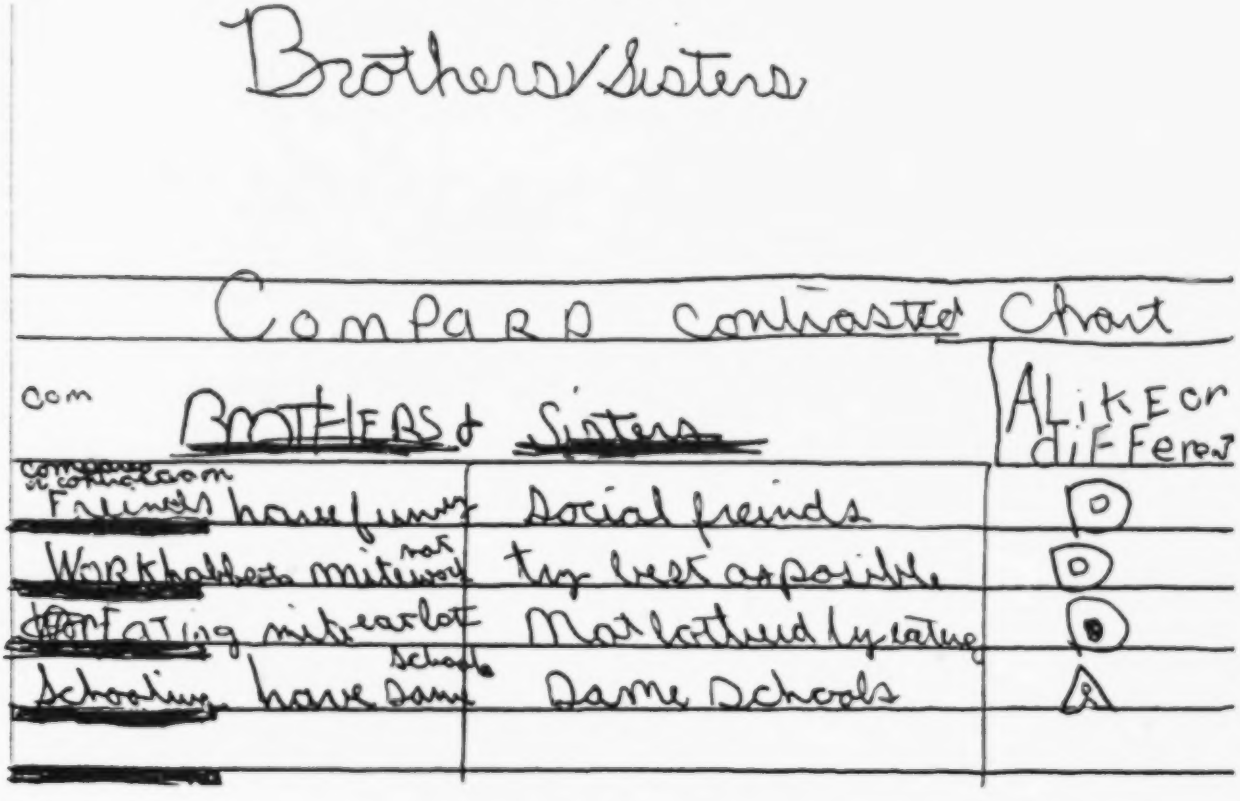
There is one part of a bike that is very special. It is the brakes. The brakes make the bike stop when you want it to and it rides better with a brake clamp. Sometimes the brakes get stripped if they are not tightened.

Without the brakes.

Without the brakes the bike will not stop and it is very hard to start peddling again. It will mess your bearing up and make your bike wheel lock. I know this because I work on bikes for a hobby.

This article is about brothers and sisters. They both might have different friends like brothers could have funny friends. The sister might have social friends that talk a lot. Also they might not want to get a job. But also, the sister might want to get a job. And the brother might be lazy. Also the eating habits are very different because the brother might want to eat eats. She eats with friends. But they go to the same schools. That's what nice about Brothers/sisters.

Chart Josh spontaneously made using note paper passed out with the test directions



Charlene

Winter versus Summer

In the winter time you can go sledding, skiing, snowmobiling, icefishing, etc. You can't do those things in the summer. Winter comes at a different time, different months, and different holidays.

Summer comes after spring which is before winter. In the summer you can go fishing, boating, swimming, ride your bicycle or go camping. It is hard to ride your bike or go camping in the winter time because you might freeze to death. Winter is cold and summer is hot.

Winter versus Summer

This article compares and contrasts winter and summer. They are being compared on winter, summer. They are being contrasted on weather, sports, light and dark, and clothes. They are alike because winter and summer and both seasons. They are different in weather, sports, light and dark, and clothes. The weather is different because in the winter it's cold and in the summer it's hot. The sports are different because in the winter you ski, and ride snowmobiles and in the summer you swim and play softball and football. In the winter it's darker because of snow. In the summer it's lighter because there is not snow. In the winter you wear warm clothes that will keep you warm because it is cold out. In the summer you wear short sleeve shirts and shorts because it is hot out.

Chart Charlene created spontaneously using note paper passed out with test directions